

Remeasured carbon I wavelengths in the photographic infrared

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In a previous paper [1] improved wavelength values for some carbon I lines were reported, most of them belonging to $3s^3P-3p^3S$ and $3s^3P-3p^3P$. The remaining multiplet in the group, $3s^3P-3p^3D$, was not measured, since the spectrograph available could be used only below 9900 Å. Subsequently the upper part of the photographic infrared was investigated by means of another grating instrument having a dispersion of 7.5 Å/mm in the first order [2]. The light source and experimental conditions were similar to those previously described [1, 3]. The discharge tube contained argon and was also supplied with neon in order to get a sufficient number of reference lines. The reference lines and the carbon lines were consequently emitted simultaneously from the source. The Ne I and Ar I standard wavelengths were calculated from interferometrically measured lines in other spectral ranges taken from current lists.

The strongest CI lines above 10 000 Å appeared as impurity lines and were measured on several spectrograms. The wavelengths, which are given in Table 1, are estimated to have an uncertainty not exceeding ± 0.02 Å. In this connection it is worth noticing that the $3s^3P_2-3P_1$ and $3P_1-3P_0$ intervals calculated from the present measures of the $3s^3P-3p^3D$ lines are in close agreement with the intervals given in the previous paper as calculated from the $3s^3P-3p^3S$, $3P$ observations.

For comparison, Table 1 also contains the observations of Kiess [4] and the solar spectrum values [5]. The agreement between the present measures and the solar values is satisfactory but Kiess' wavelengths are about 0.1 Å higher. This

Table 1. Wavelengths of infrared carbon I lines.

Int.	λ , present obs.	λ , Kiess	λ , Sun	σ (cm ⁻¹)	Combination
calc.	10 683.09 ¹	.18	.09	9358.02	$3s^3P_1-3p^3D_2$
9	10 685.341	.44	.36	9356.05	$3P_0-3D_1$
15	10 691.241	.36	.24	9350.89	$3P_2-3D_2$
10	10 707.319	.44	.36	9336.85	$3P_1-3D_1$
9	10 729.526	.59	.588	9317.52	$3P_2-3D_2$
2	10 753.97	—	4.02	9296.35	$3P_2-3D_1$
2	11 330.29	.36	—	8823.49	$3p^1P_1-3d^1D_2$

¹ Masked by the strong A II line 10 683.05 Å.

Table 2. $3p^3D$ levels of CI.

Desig.	Level	Interval
$3p^3D_3$	69 744.39	
$^3D_2$	69 711.02	33.37
$^3D_1$	69 689.84	21.18

discrepancy is larger than that reported in the previous paper for the 8300–9600 Å range.

From Table 1 it appears that the line 10 753 Å, which is known from the solar spectrum, has now been measured also in laboratory. λ 10 123 Å [6] was too faint to permit an accurate wavelength determination.

The new wavelength values have been used to recalculate the $3p^3D$ levels of CI with the $3s^3P$ level values of the previous publication [1] as a base (Table 2).

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